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Analysis of usage data for online course- 3551
Research perspectives in educational CMC - OISE

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Technical Paper # 24

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INTRODUCTION

Computer mediated communication is relatively new to education and little is yet known about the best ways to use this promising tool. A number of potential uses and benefits have been identified and a few pioneering uses have been implemented.

To put this paper in perspective - Winkelmans (1988) describes several phases of media research: descriptive studies, evaluative studies, studies of effects, and process research. Based primarily on usage statistics this paper is essentially a descriptive study with evaluative considerations. It examines one specific use of computer conferencing in education with a view to assessing the effects of several different design parameters on actual use.

Caveat:

The discussion that follows is grounded in a quantitative analysis of usage statistics. It should not be seen in any sense as an evaluation of the quality of learning that has taken place. A rigorous analysis of the actual content of the transcripts is necessary for that. It is hoped that this treatment may shed some useful light on course design and the influence of various parameters. Nonetheless, it must be recognized that many of the conclusions reached are entirely speculative in the absence of careful content analysis.

COURSE DESIGN

The course is a graduate seminar conducted entirely online with the exception of a brief introductory session during the first week that was used mainly for distribution of course materials and administrative tasks.

The primary didactic principle of the course is based on peer collaborative exploration. Grounded in current learning theory, this method in brief depends on repeated cycles of internalizing, externalizing, and feedback.

Most sessions lasted one week. The exception was session 10 that was stretched over three weeks to accommodate various vacation schedules. For the most part the task consisted of online discussions focused around a specific reading for each session. For 5 sessions the author of the paper was also able to participate as a guest. The instuctor wore the dual hat of author/instuctor for 2 of these sessions.

Session 3 was unique in that the task was to work in pairs to develop a specific product - a research agenda.

For each of sessions 4 through 11 one or two students were assigned responsibility for moderating the conference.

In addition to these core conferences in which participation was expected, several supplementary conferences were

available for various purposes related to the course; some initiated by the instructor and some by students.

All of the 14 students in this course were experienced professionals involved in some aspect of education and all had taken at least one previous course in cmc using the PARTICIPATE conferencing system. Thus technical problems with either hardware or software should not have been a major factor with this group.

METHODOLOGY

The PARTICIPATE software that was used for these conferences generates a header for each note that includes the note number, author, date, time, and number of characters. This information was collected by scanning the first line (the header) of each message for each conference and branch. This was saved in a text file and the information was then transferred to a database where it could be sorted, manipulated, and transferred to spreadsheets for calculations.

Information was collected from all conferences and branches that were deemed a part of the course. A survey from some Japanese students and a TV Ontario poll were excluded. Also omitted were 2 long notes from the instructor that were uploads of discussion papers and were also distributed in

hardcopy. A few duplicate notes were sent. These were counted only once. (I hope.)

The data was collected for a period of 13 weeks representing 11 sessions of the course. Included also are 11 notes entered in the weeks preceeding the first week of the course.

MESSAGE FLOW ANALYSIS

At its most basic level message flow analysis is the density of messages per unit of time. This may be one of the easiest forms of analysis that can be performed on the data generated by computer conferences. Nonetheless, some useful information can be extracted from such an analysis.

Levin et al. (1988) used a message flow analysis to show the importance of local and individual schedules in the design of an asynchronous environment. Another significant point that arose from their preliminary analysis was the need for an extended startup period.

Winkelmans (1988) applied the procedure to a one week sample of a similar course. His results suggested a weekly cycle with peaks at the begining and end of the week with a hiatus in mid-week (Friday), with the suggestion of implications for instructional design and further research.

Two measures of volume can be used; number of notes sent or length of notes sent. For a given task there is a general consistency in the results obtained with both of these measures. But in some specific cases one or the other may be a more appropriate measure. Both measures have been used here.

Participation is used in this paper in the sense of active participation, writing notes. Passive participation, reading notes, has not been measured.

DAILY MESSAGE FLOW

As will be shown later there was a strong daily rhythm in the usage pattern for the participants in this course. To accomodate the largely nocturnal habits of these users I have considered for the purposes of these analyses a day as being the 24 hour period beginning at 6:00 AM. Messages were sent on 89 of the 91 days of this course. The two days when no notes were sent were at least partially influenced by disruptions to the system for maintenance.

An examination of the daily message flow whether by number of notes (fig. 1) or by length (fig. 2) shows considerable variation from day to day. It is difficult to discern any clear pattern from this data other than that participation can be expected to vary quite dramatically from one day to

Figure 1 - DAILY MESSAGE FLOW
Number of Notes

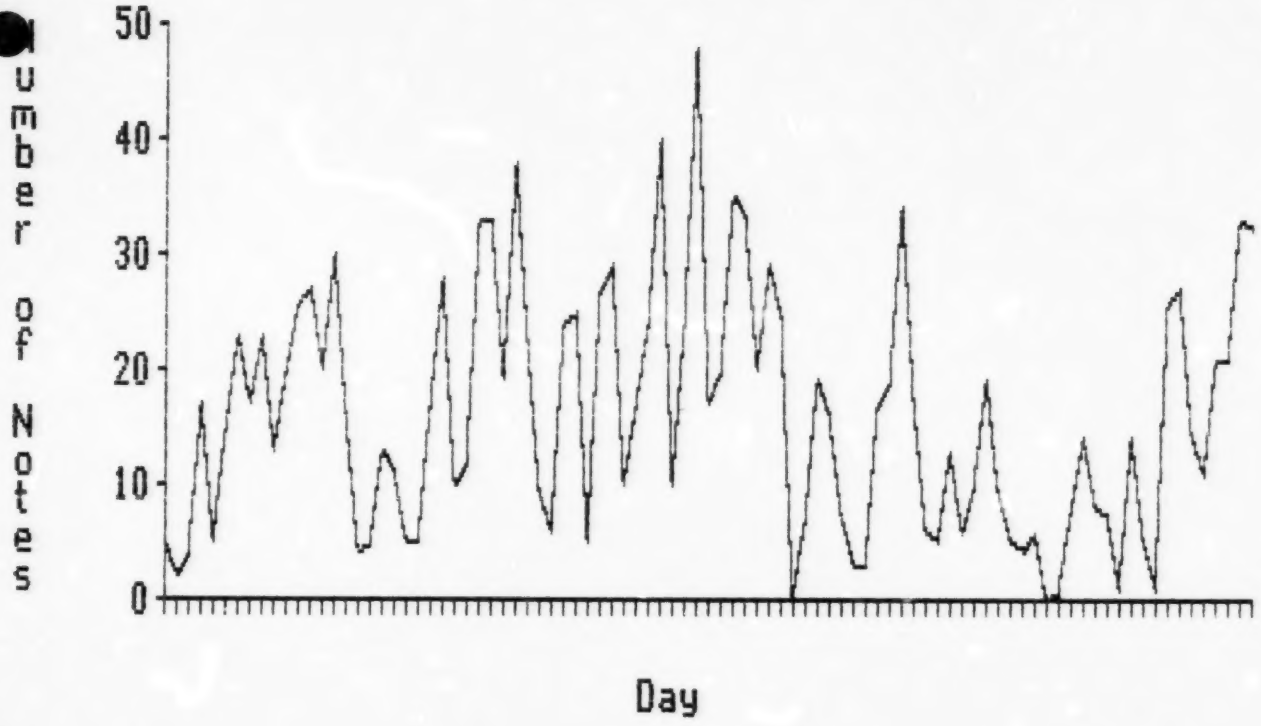
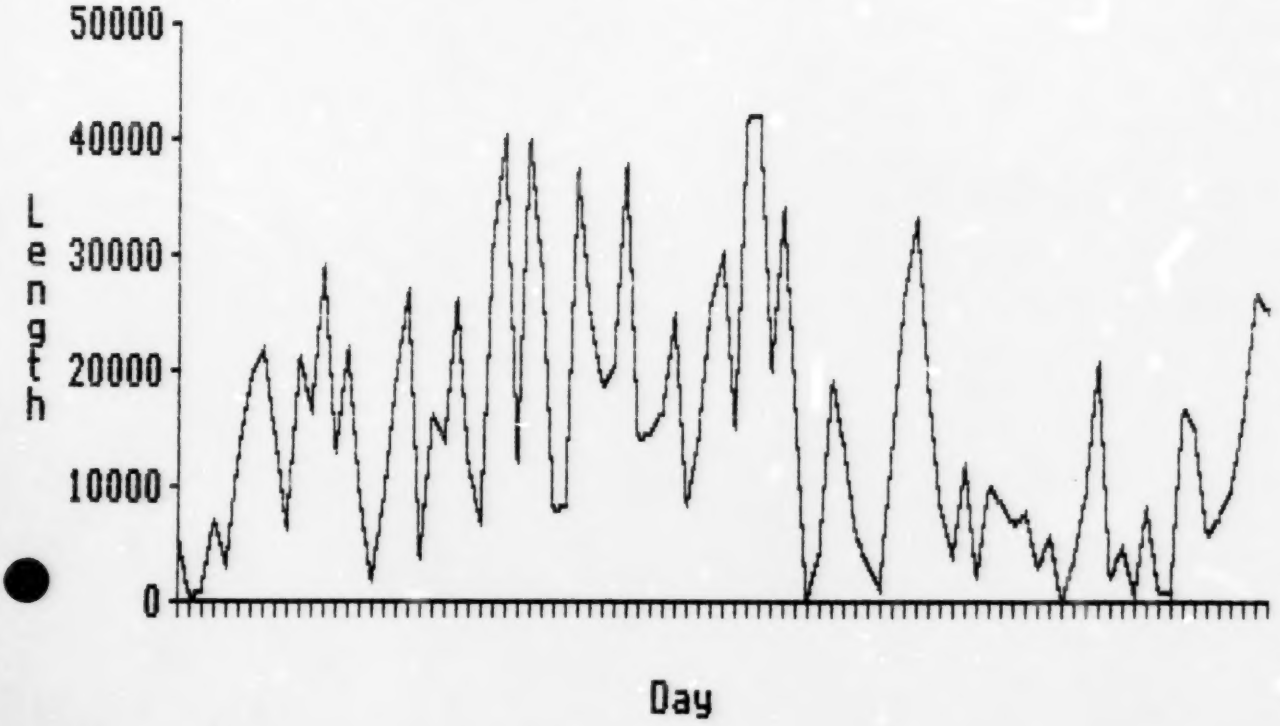


Figure 2 - DAILY MESSAGE FLOW
Length of Notes



the next. As might be expected with a group of experienced users the startup time was less than 1 week.

The effect of the unique task in session 3 is shown most clearly in figure 1 in the decline in notes sent for days 16-21. The data collected here does not include private messages and the task for session 3 invloved a significant degree of private correspondence between team members with only the final product being presented. It may be assumed that the total message volume for this session including private messages was not greatly depressed. Nonetheless, with regard to many-to-many communication with the class as a whole, the assignment of working in pairs to produce a product had the predictable effect of reducing message volume.

It does appear from these graphs that participation dropped significantly in the second half of the course, after about day 52. But at least some of that decline in activity can be attributed to the effect of the extended vacation period from days 63-77. An examination of participation on the basis of weekly session and core conference will shed further light on this.

PARTICIPATION BY WEEKLY SESSION

While the daily participation rates show considerable fluctuations, weekly rates show a much more consistent pattern. Whether by number of notes (fig. 3) or by length (fig. 4) the level of activity rose quickly by the second week, dropped slightly in the third week due to the unique task assigned that week, and rose to a peak in week seven.

In the daily message flow we noted a decline in average number of messages after day 52. This would be the beginning of week 8. The weekly message flow analysis seems to confirm this. When the three calandar weeks of session 10 are compressed into one session the decline in number of notes appears to have lasted only 2 sessions. However, when we look at total length (fig. 4), the decline in activity may be seen as more lasting.

Was this decline in activity after week 7 due to collective weariness, disinterest in the topics for those weeks, or perhaps some effect of the moderators or change in the structures for those weeks?

I had some thought initially that the level of participation of the instructor could be influencing this. It is not unreasonable to suppose that the active presence of the instructor in the discussion would motivate students to

Figure 3 - WEEKLY MESSAGE FLOW
Number of Notes

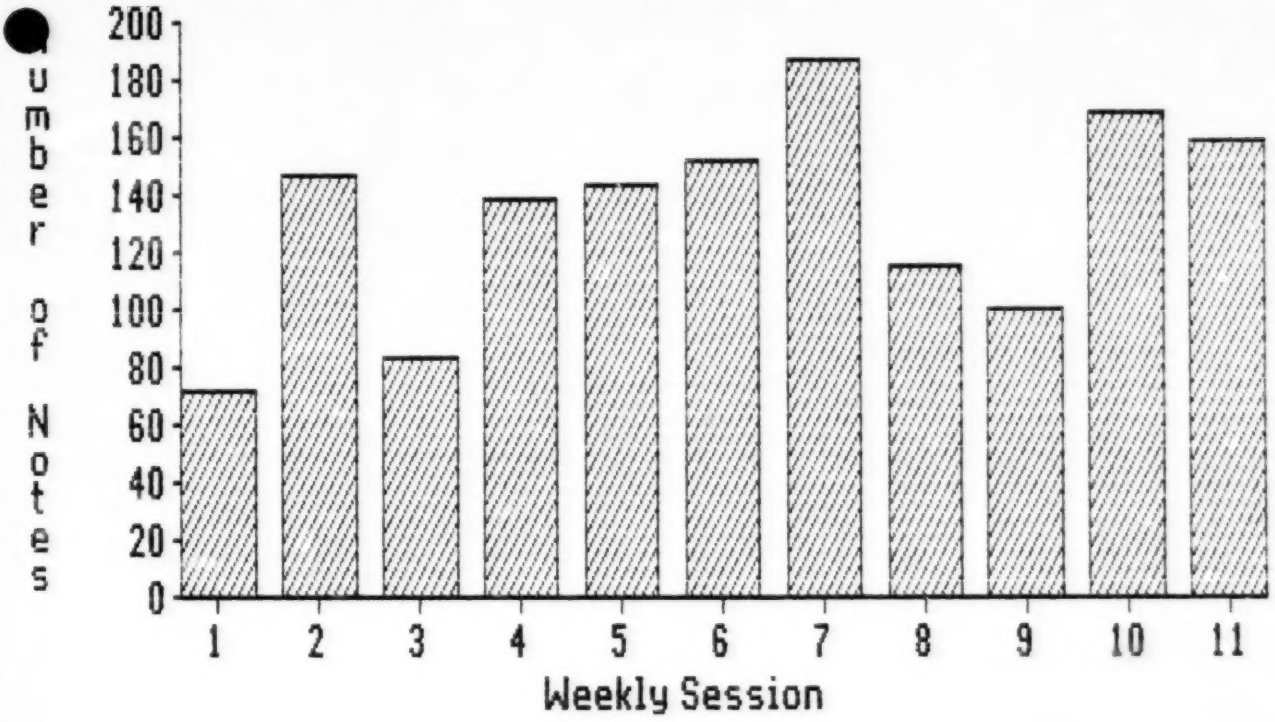
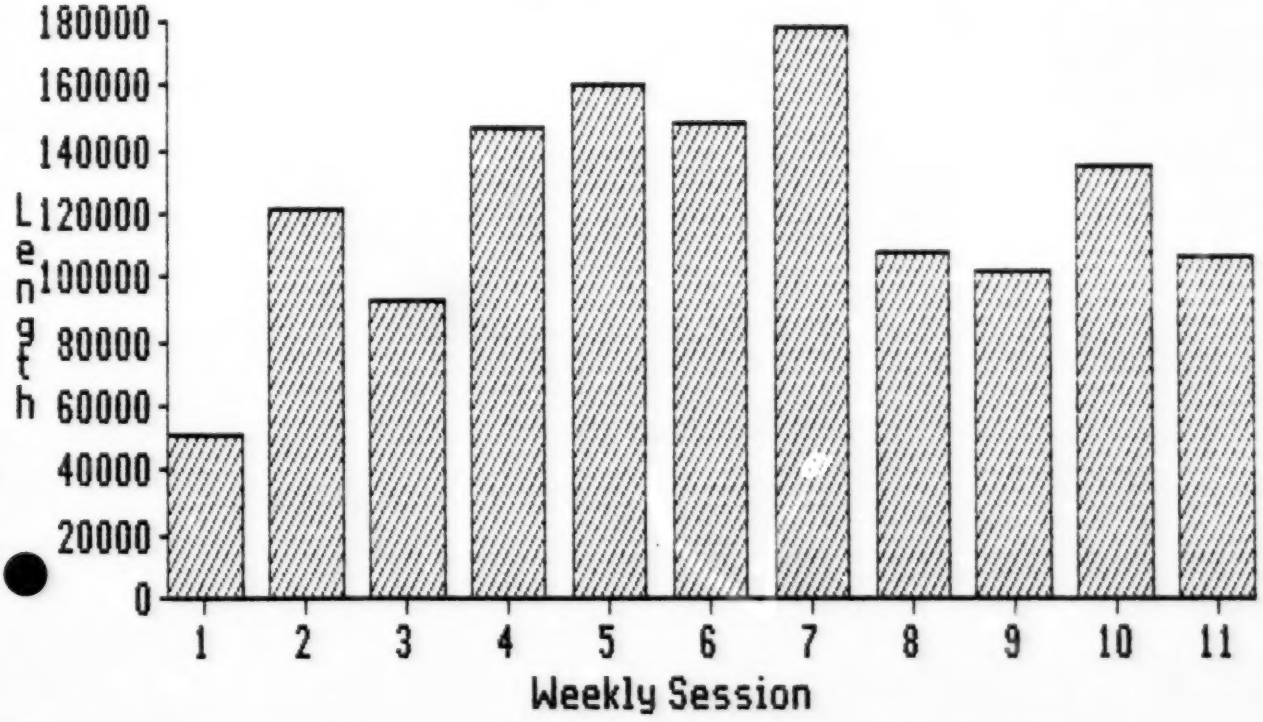


Figure 4 - WEEKLY MESSAGE FLOW
Length of Notes



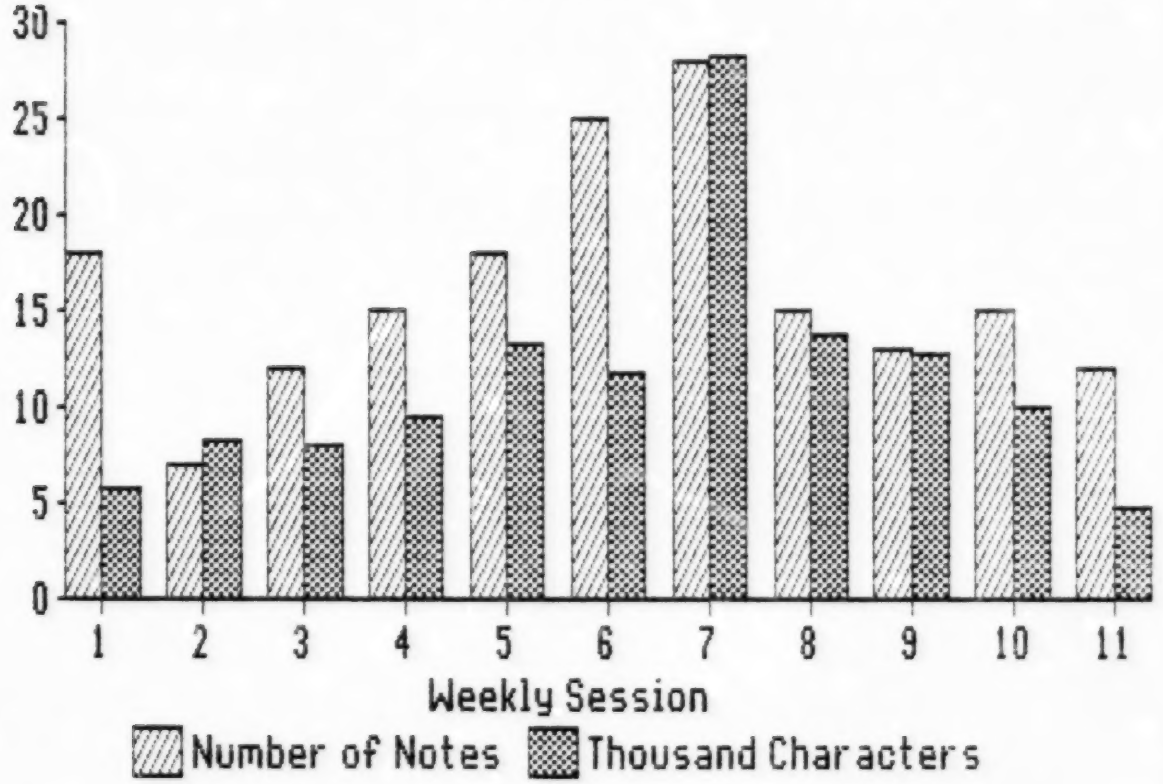
participate more. The message flow pattern for number of notes sent by the instructor (fig. 5) does indicate a proportional decrease after session 7. But if we look at the total length we see that only session 7 was unusual and that will be explained elsewhere. The total length of instructors comments was not below normal.

Another contributing factor may be the influence of online guests. Sessions 4-6 each had as a guest participant the author of the paper. And for session 7 the instructor had the dual role of author/instructor. Therefor session 8 was the first of these sessions to not include the author. This may well have contributed to the drop in overall activity.

An examination of the activity in the core or assigned conferencess will show a much smaller change in this period. It can thus be determined that the decline is largely due to a marked decrease in participation in supplemental activities. This would seem to support most strongly the hypothesis of collective weariness. Students were attending to assigned tasks but showed little interest in supplemental explorations.

There does appear to have been a modest but significant decrease in the total activity after session 7. This is most evident in the graph of total length (fig.4). Several factors may have contributed to this, but the evidence of

Figure 5 - WEEKLY MESSAGE FLOW
Instructor



continued participation in assigned activities (figs. 6 & 7) suggest a collective weariness with the process may have set in.

PARTICIPATION IN CORE CONFERENCES

Each of the 11 sessions of the course focused on a distinct reading or task and was discussed in one or more conferences. I have called these Core Conferences as distinct from the Supplemental Conferences in which participation was entirely voluntary. Please note that the 11 sessions discussed in this context are not exactly equivalent to the 11 weekly sessions discussed in the previous section. While most of the tasks were scheduled for one week there was frequently overlap of tasks at both the beginning and end of the week. The analysis in this section is intended to abstract from that overlap the activity in each specific task, and also eliminate from consideration the activity in the supplemental conferences.

With three exceptions (sessions 3, 7, & 11) the participation in core conferences as measured by number of notes (fig. 6) was quite consistent. The aberrant session three with its unique task has been discussed elsewhere. In session 11 the moderators took an active role in encouraging short notes which may account for the elevated numbers. The

Figure 6 - CORE SESSION MESSAGE FLOW
Number of Notes

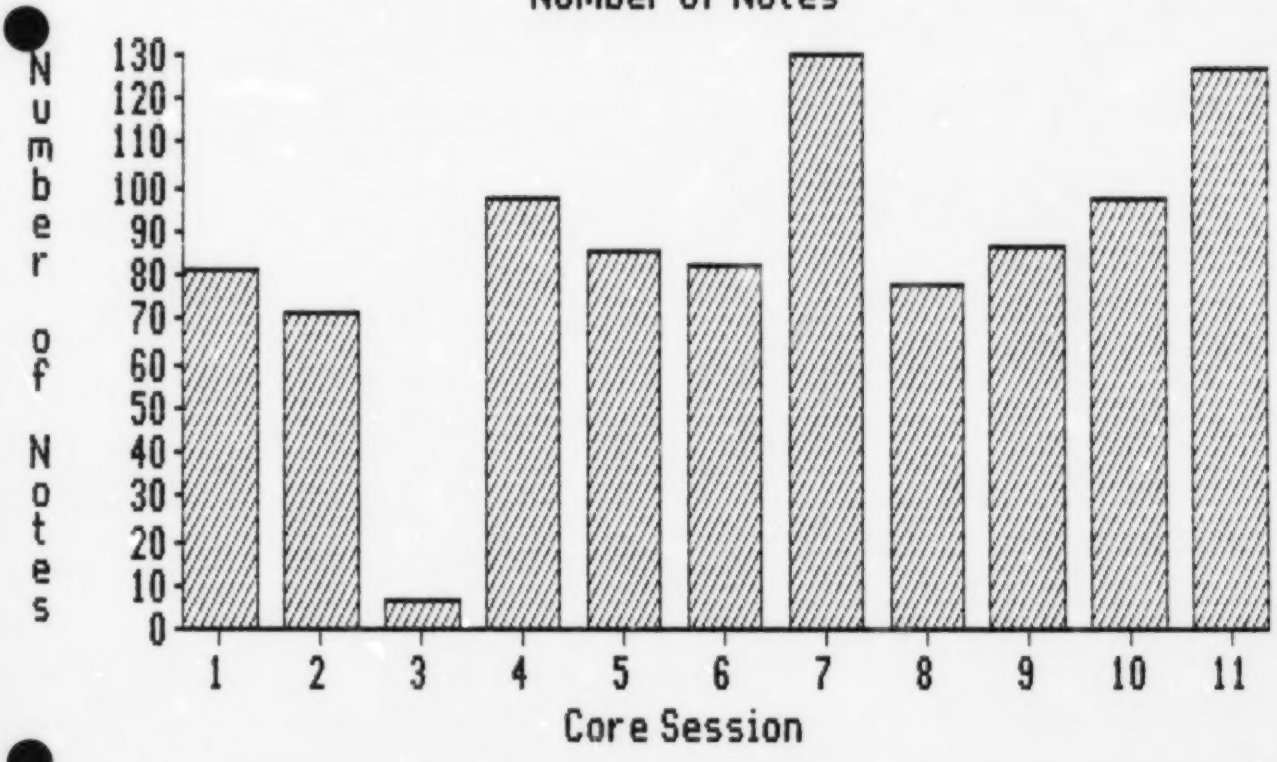
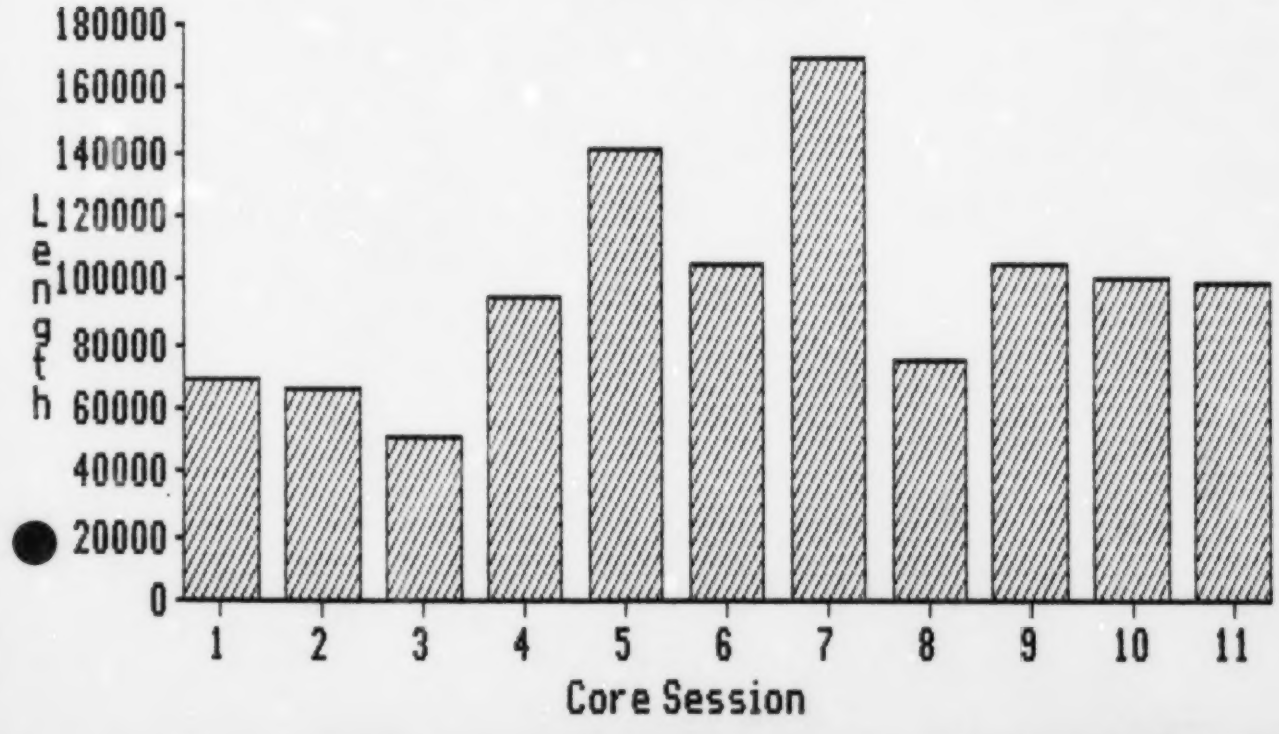


Figure 7 - CORE SESSION MESSAGE FLOW
Length of Notes



modest total length of notes for that session (fig. 7) seems to confirm this.

Session 7 is a little more complicated. The instructor was also author of the paper for that session and thus, in the dual role of guest and instructor contributed more than 3 times as many notes as usual. But that does not account for all of the heightened interest in this session. Six students also contributed more than average notes to this session, some remarkably more. And 8 students contributed more than average length to this session. Three students accounted for 44% of the total notes sent. On length the distribution was much more even, the top three students accounting for only 30% of the total length. It can be surmised from this heightened activity that for some students at least, the content of this session was of particular interest. Sycophancy can be at least partially ruled out by noting that session 9 which the instructor also coauthored did not generate heightened activity.

Examination of the participation in core conferences as measured by length (fig. 7) discovers an additional peculiarity in the greater length of session 5. This session had very active guest contributions and as will be seen, guests write longer than usual notes. The guests in this session wrote 24% of the notes and accounted for 29% of the length. The moderator for this session also contributed

longer than usual messages, accounting for 29% of the total length.

With the exceptions noted above it can be seen that overall participation in the core conferences was consistent throughout this course. This is true despite rather dramatic fluctuations in individual participation. Is this merely an averaging effect? Or does the level of participation achieved here represent a maximum level that might be expected for these specific conditions? One could postulate that there is an inverse relationship between the amount of text already written to a conference and the additional amount that any given student will write, perhaps because more time is spent reading. Or perhaps because the easy points have already been made. We will return to this point later in the discussion of dominance.

PARTICIPATION IN SUPPLEMENTAL CONFERENCES

There were 13 supplemental conferences set up for various purposes in which participation was entirely voluntary. The activity in these conferences represented 35% of the total messages in the course and 20% of the total length. Some of these conferences were active for the full 13 weeks. Some for only 1 day. As might be expected participation in these conferences was very unevenly distributed.

Seven of these supplemental conferences were initiated by students. Participation in these student initiated conferences was exceptionally low. It can be seen from Table 1 that in all of the student initiated conferences few people actively participated, few notes were sent, and in most cases the initiator of the conference wrote most of the notes.

Table 1 - Participation In Student Initiated Conferences

Student Conference	Notes By Initiator	Notes By Others	Total Notes	Total No. Participants
1	3	0	3	1
2	5	5	10	3
3	3	1	4	2
4	4	5	9	4
5	5	12	17	7
6	3	9	12	4
7	11	3	14	4

The activity in these student initiated conferences represented only 13% of the total activity in the supplemental conferences and 5% of the total number of notes in the course. In this instance, allowing students the opportunity to initiate branch conferences did not lead to extensive use.

INDIVIDUAL VARIATION

There was considerable variation in the online behaviour both between individuals and for the same individual from week to week. Figures 8-21 summarize the information in appendix A for each of the 14 students. The ratio between number of notes and length is a measure of the average length of note for that week.

Some people were very consistent in their online behaviour throughout the course. Some were generally consistent but wrote much more as moderator. And some varied wildly from week to week. For some participants, identifiable patterns can be discerned. While for others, the behaviour appears chaotic.

This evidence clearly belies any attempt to predict an individual's behaviour on the basis of class norms. On the contrary, despite the homogeneity of the participants in this course a great deal of individuality emerges even at this extremely coarse level of analysis.

EQUALITY

It has been asserted in some reports that the democratizing effect of cmc results in a reasonably equal distribution of participation.

Figure 8 - WEEKLY MESSAGE FLOW
Student 1

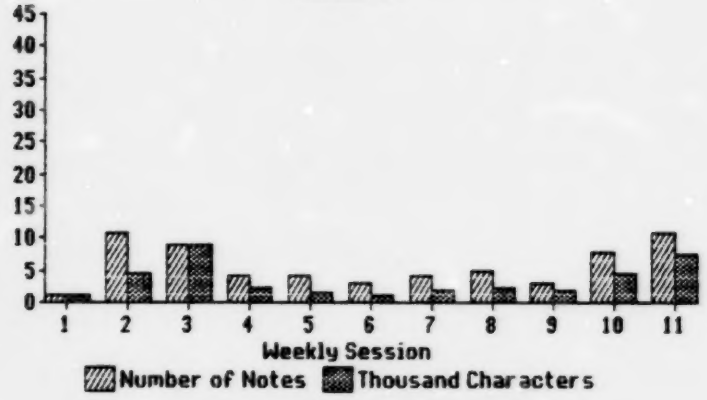


Figure 9 - WEEKLY MESSAGE FLOW
Student 2

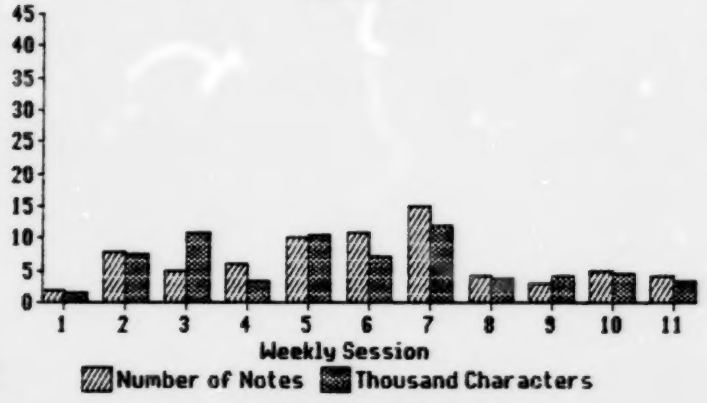


Figure 10 - WEEKLY MESSAGE FLOW
Student 3

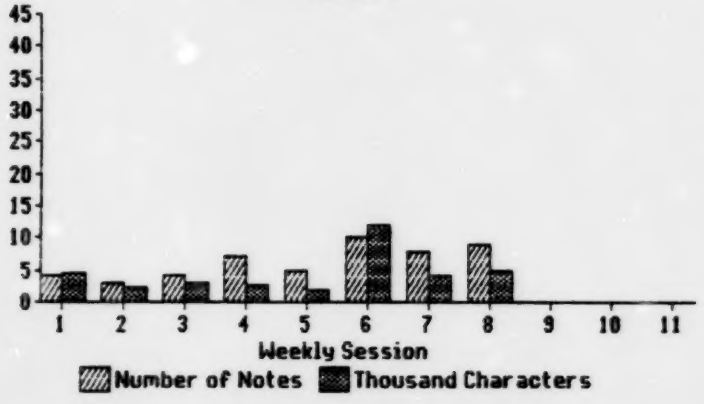


Figure 11 - WEEKLY MESSAGE FLOW
Student 4

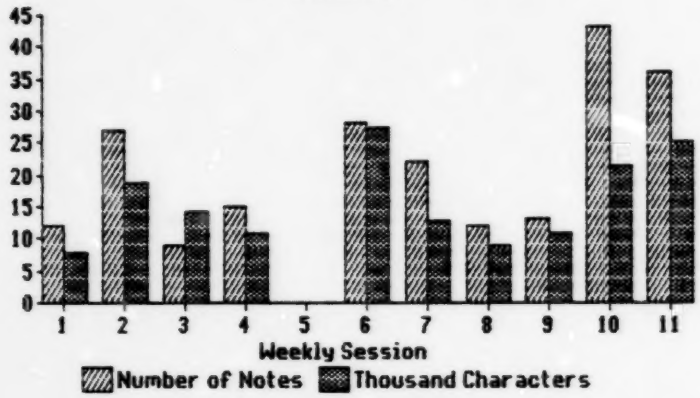


Figure 12 - WEEKLY MESSAGE FLOW
Student 5

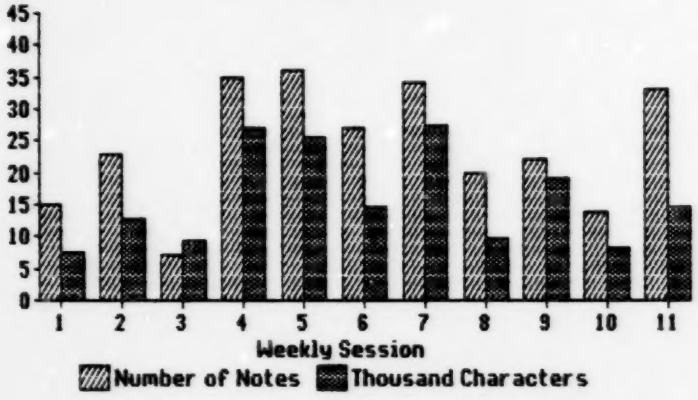


Figure 13 - WEEKLY MESSAGE FLOW
Student 6

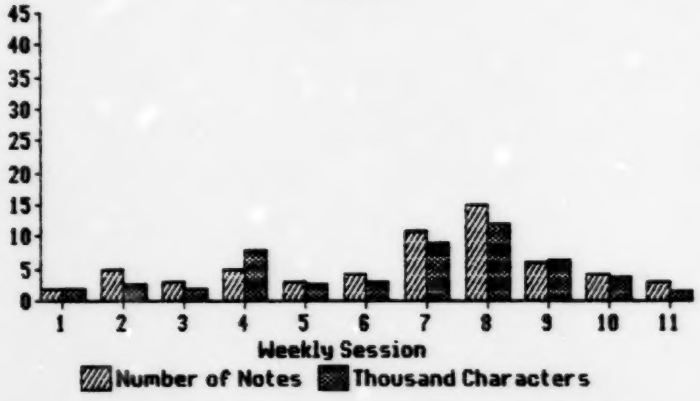


Figure 14 - WEEKLY MESSAGE FLOW
Student 7

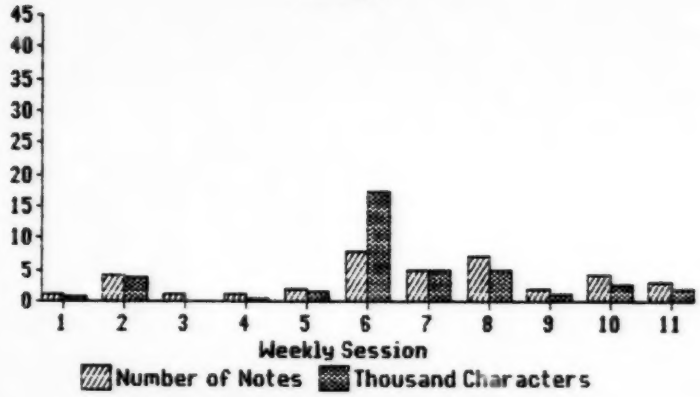


Figure 15 - WEEKLY MESSAGE FLOW
Student 8

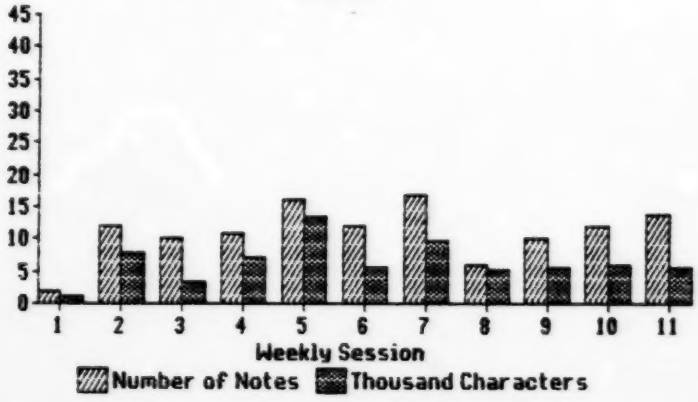


Figure 16 - WEEKLY MESSAGE FLOW
Student 9

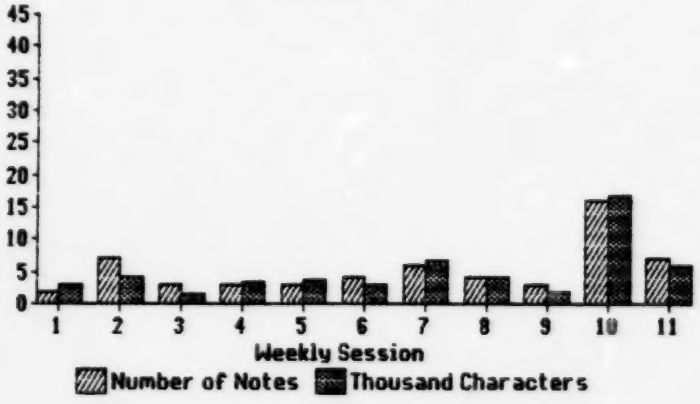


Figure 17 - WEEKLY MESSAGE FLOW
Student 10

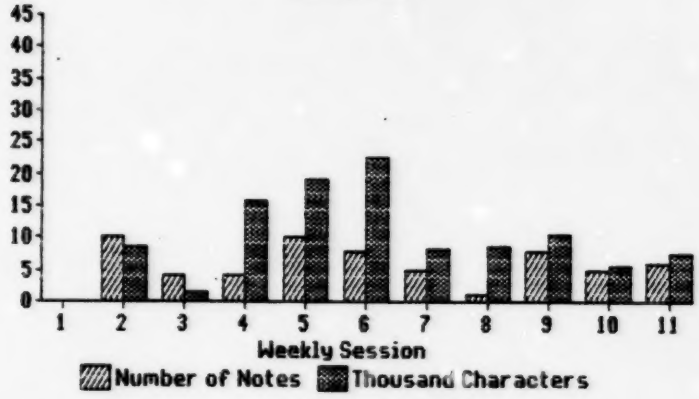


Figure 18 - WEEKLY MESSAGE FLOW
Student 11

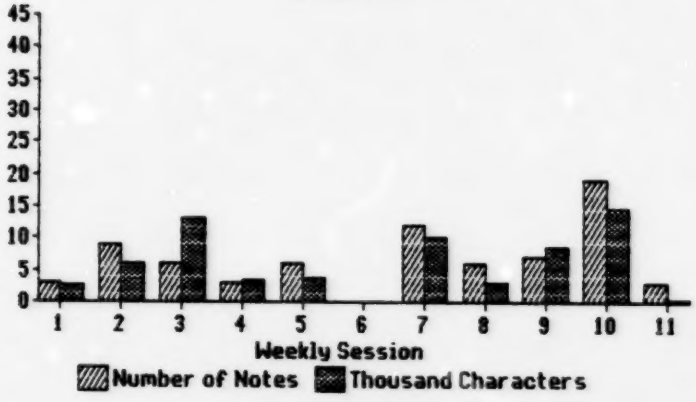


Figure 19 - WEEKLY MESSAGE FLOW
Student 12

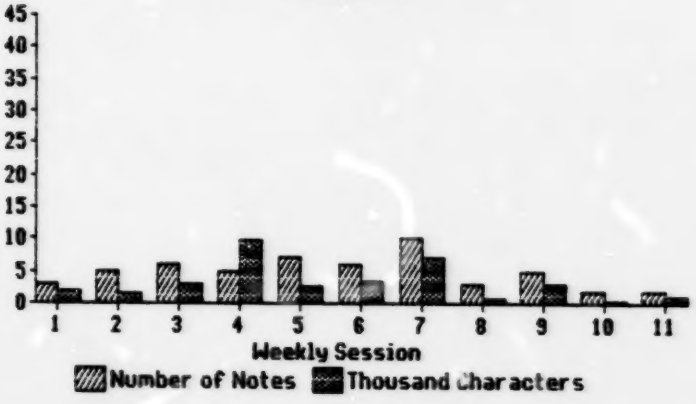


Figure 20 - WEEKLY MESSAGE FLOW
Student 13

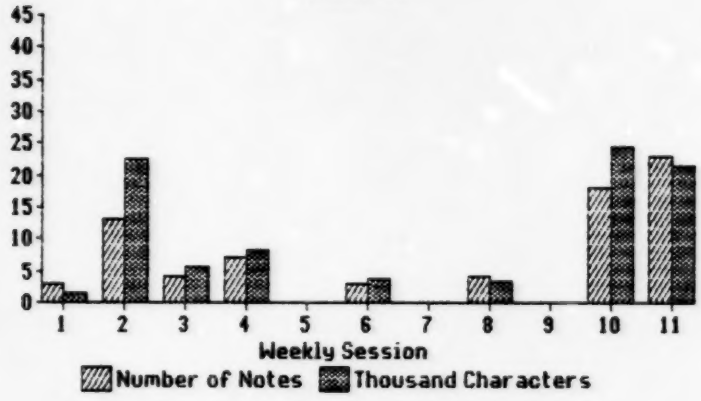
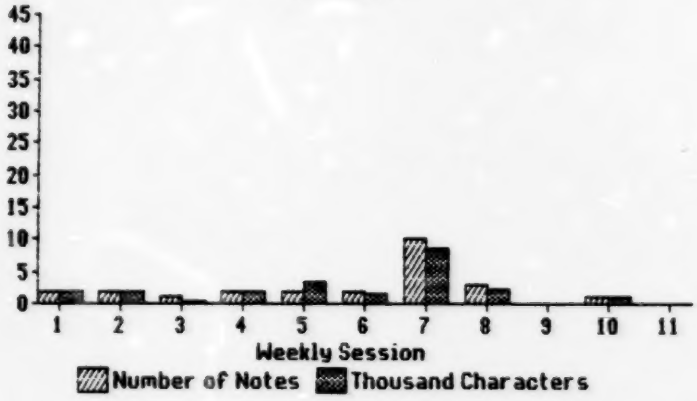


Figure 21 - WEEKLY MESSAGE FLOW
Student 14



"The nature of collaboration is unique, in that analysis of usage statistics of the amount written per user in online group learning courses is relatively equitably distributed: most learners are participating and they are participating more or less the same amount." (Harasim, 1989).

In this course there was considerable variation in the amount written. Between the most and least active students there was a difference of a factor of 10 in the number of notes written and a factor of 8 in length. To be sure the distribution of notes sent was reasonably equitable for the majority of students. Nine students were within a 30 note range. The distribution on the basis of length was marginally greater with 9 students falling in a 40,000 character range. But what of the students on the extremes?

From the summary statistics presented in table 2 it appears that 2 students dominated the discussions, accounting for 1/3 of the notes written and 1/4 of the total length. Including the instructor's comments, 3 people wrote 45% of the notes and 35% of the total length. What does this say about the degree of interaction in the conference? Is this a problem for what is intended to be an interactive environment?

Table 2 - Summary Of Participation By Individuals

USER	TOTAL NOTES	%	TOTAL LENGTH	%	MEAN LENGTH
STUDENT 1	63	4%	37314	3%	592
STUDENT 2	73	5%	68431	5%	937
STUDENT 3	51	3%	34727	3%	681
STUDENT 4	217	15%	156038	12%	719
STUDENT 5	266	18%	176254	13%	663
STUDENT 6	61	4%	52734	4%	864
STUDENT 7	38	3%	39370	3%	1036
STUDENT 8	123	8%	71174	5%	579
STUDENT 9	58	4%	54063	4%	932
STUDENT 10	61	4%	107861	8%	1768
STUDENT 11	75	5%	65536	5%	874
STUDENT 12	56	4%	35022	3%	625
STUDENT 13	75	5%	91122	7%	1215
STUDENT 14	25	2%	23021	2%	921
INSTRUCTOR	184	12%	128813	10%	700
STUDENT TOTAL	1242	84%	1140179	84%	918
GUEST TOTAL	48	3%	82579	6%	1720
COURSE TOTAL	1474	100%	1351571	100%	917

But in what sense can a person (or persons) be said to "dominate" a computer conference? At first blush it would not seem to be quite the same as talking too much in a f2f session. After all, one of the touted advantages of computer conferencing is the lack of competition for air time.

"The lack of competition for air time was another important factor in encouraging more active participation. An advantage of computer conferencing is that everyone can

participate to the degree that he/she wishes." (Harasim, 1987).

It would seem that one person's excessive writing should not interfere with anyone else's opportunity to contribute as it does in verbal situations where only one person can speak at a time. Thus "dominating" a computer conference should not be quite the same as dominating a f2f discussion.

On the other hand, as noted in the discussion on core participation, it is quite possible that there is an inverse relationship between the amount already written and the amount that a given student will add. It may be that more of the time the student has budgeted for the task is spent reading. Or it may be a feeling that everything has already been said. If indeed this is the case, then overly prolific writers may have a dampening effect on the level of interaction in a conference.

PARTICIPATION BY DAY OF WEEK

While online activity in this course was distributed throughout the week, it was not evenly distributed. Table 3 indicates the considerable variability in the number of messages on any given day of the week.

Table 3 - Variation in Activity by Day of Week

DAY	MAX	MIN	AVG	STD	
SUNDAY	35	1	22	10	MAX = maximum # notes
MONDAY	40	5	23	10	
TUESDAY	30	5	13	9	MIN = minimum # notes
WEDNESDAY	38	2	16	11	
THURSDAY	48	1	16	13	AVG = mean # notes
FRIDAY	21	0	11	6	
SATURDAY	26	1	12	7	STD = standard deviation

Two factors might be expected to influence the daily rates of participation. First, most of the students were part-time, working at fulltime jobs during the week. They might therefore be expected to actively participate more on weekends.

The second influence is the course design. Each weekly session officially began on Tuesday, ending the following Monday. Participation was a factor in course evaluation. Students were instructed to logon at least twice a week, once at the beginning of the session and once towards the end. Winkelmans (1988) in analysing one week of a similar conference reported elevated messaging at the beginning of the week as participants rendered initial positions and responses to the readings, falling off on Friday and then rising to a maximum on Monday.

Looking at the daily activity in this course over 13 weeks, there is great variability from week to week and no clear pattern emerges. Overall, though (Table 4), it is clear that

Sunday and Monday were by far the busiest days of the week and Friday and Saturday the least active.

TABLE 4 - ACTIVITY BY DAY OF WEEK

DAY	# NOTES	%	LENGTH	%	MEAN LENGTH
SUNDAY	284	19%	294695	22%	1038
MONDAY	293	20%	266589	20%	910
TUESDAY	166	11%	164908	12%	993
WEDNESDAY	215	15%	170077	13%	791
THURSDAY	207	14%	171532	13%	829
FRIDAY	147	10%	137041	10%	932
SATURDAY	162	11%	146729	11%	906

This large end-of-session activity could (and probably does) have a number of causes. It might be a result of earlier comments begetting multiple reactions. But in that case the activity might be expected to rise smoothly and perhaps logarithmically to a peak. The dramatic leap in activity from Saturdays to Sundays augers against this explanation.

Alternatively, it might be merely a deadline phenomenon as participants strive to make a contribution before the session ends. In fact, the data seems to support this explanation more strongly. The slightly higher length of messaging on Sunday may be attributed to the weekend effect.

Argueing against this explanation, however, is the evidence from the aberrant session 10 which stretched over a three week period. In that case, even with no imminent deadline looming, the intervening Sundays and Mondays were still

relative peaks of activity. Was it by this point in the course an habitual pattern of participation? Or are there sociological factors in the lives of these students that predicate higher activity in the online course on these days?

VARIATION IN MEAN LENGTH BY DAY OF WEEK

Table 4 also indicates some variability in the mean length of note by day of week. Could this be a reflection of different processes at work at different stages of the weekly session? Certainly some of the moderators entered longer than usual introductory statements, and these often came on Tuesday, the first day of the session.

Summary and synthesis notes might be expected to be longer and should have been sent most frequently at the end of the session. By this reasoning Mondays would show longer than average notes. That the longest average notes were sent on Sundays instead requires further content/process analysis to explain. Was it a weekend effect, more time on task resulting in longer notes? Or were there different processes at work on these days? Perhaps Monday's corpus included numbers of shorter responses or amplifications of the previous day's deluge.

And then what meaning can be derived from the shorter notes sent on Wednesdays and Thursdays? Is it merely time on task, or are there different processes at work at different stages in the progress of a conference?

PARTICIPATION BY TIME OF DAY

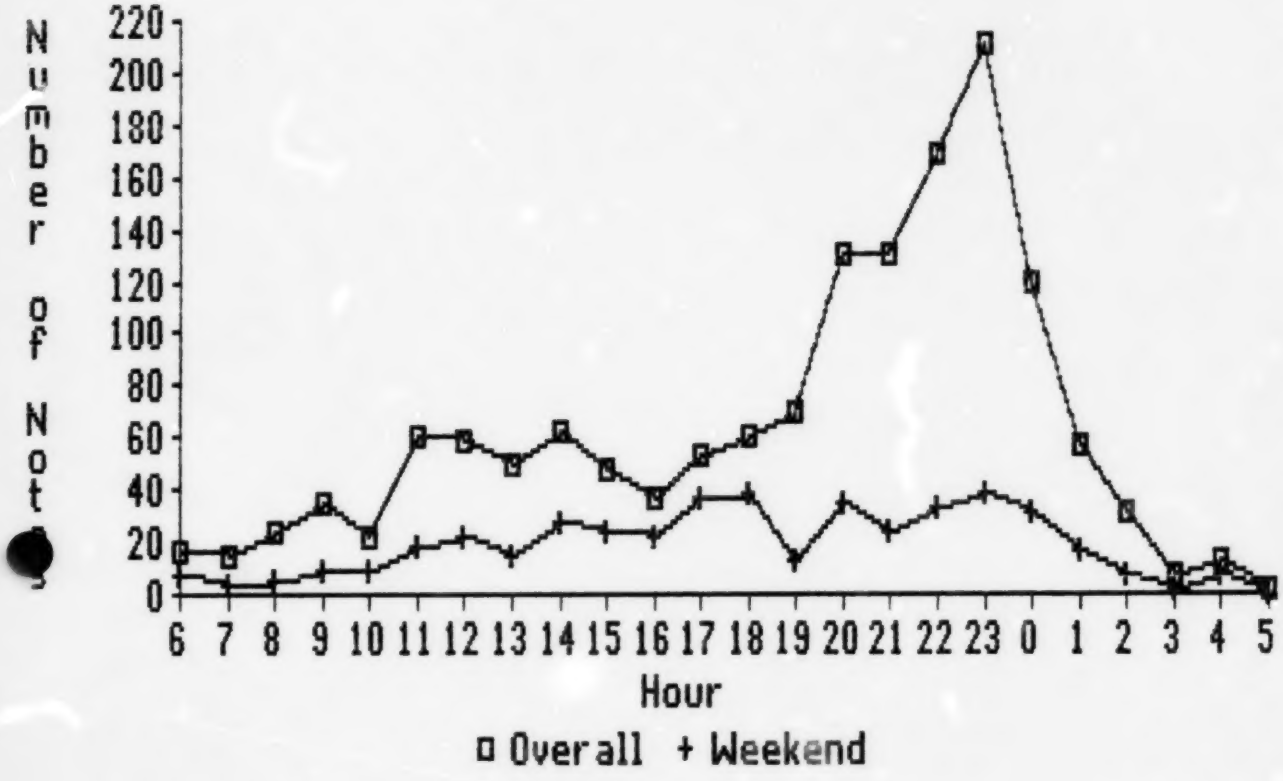
Messages were entered at every hour of the day. Given that most participants held fulltime day jobs, it is not surprising that most of the acivity was in the evening and night. Table 5 shows the activity in four hour periods.

Table 5 Time Of Day When Messages Are Entered.

	OVERALL		WEEKEND	
TIME	No.	%	No.	%
0200-0600	53	4%	17	4%
0600-1000	89	6%	25	6%
1000-1400	191	13%	64	14%
1400-1800	199	13%	110	25%
1800-2200	392	27%	110	25%
2200-0200	554	37%	120	27%

A more detailed hour by hour analysis (fig. 22) shows three major phases. A period of relatively little activity through the morning rising moderately at 11:00 AM, continuing at a moderate level through the day and early evening, then

Figure 22 - HOURLY MESSAGE FLOW



rising sharply at 8:00 PM until 1:00 AM whereafter activity drops off very quickly.

The single largest hourly cohort was from 11:00 PM to midnight with 14% of notes entered at that hour. Fully 51% of the notes were entered in the 5 hour period from 8:00 PM to 1:00 AM.

WEEKEND PARTICIPATION BY TIME OF DAY

To further explore the cause of this largely nocturnal participation, we can examine the time of day when notes were entered on weekends when presumably more hours would be available to most particicpants. We might expect to see a more even distribution of use throughout the day on weekends.

The results shown in Table 5 display a remarkably similar rate of participation through the morning and early afternoon on weekends compared to the overall rate of use. On weekends there was greater activity in the late afternoon and proportionately less late night activity.

A graph of the hourly activity on weekends (fig. 22) shows a pattern very similar to the overall pattern but with a much less dramatic nocturnal peak. As with the overall use there were three discernable levels of activity; low usage through

the morning, rising moderately at 11:00 AM, and rising to a slightly higher level at 5:00 PM to 1:00 AM whereafter use drops off rapidly.

30% of the total messages were entered on weekends.

One practical application of this data is that disruptions to the system for repairs or maintenance would be of much less consequence for these users if they could be scheduled between the hours of 1:00 AM and 11:00 AM.

One might also postulate that a note entered near the beginning of the nocturnal peak would be more likely to engender a relatively prompt response. That is if a person was looking for quick feedback to a thought it would be important to submit it before or early in the nightly surge of activity. An examination of intermessage referencing against time of day could illuminate this hypothesis.

And a person looking for immediate feedback or real time interaction would be most likely to find a colleague online between 11:00 PM and midnight.

MODERATOR EFFECT

Each student was assigned the task of acting as moderator for a session. The moderator was to prepare an introduction to the key themes for the week, provide a focus, and

summarize the discussion at week end. Twelve students worked in pairs on this task. The other two were solo efforts.

What effect would this task have on the student's pattern of participation? Would he write more notes? Longer notes? Would preparation for this assignment cause lowered participation in the preceding week? Or fatigue cause lowered participation in the succeeding week?

Table 6 - Effect Of Moderator Task On Participation

	Number of Notes As Moderator	Average For Other Core Conferences	Mean Length Of Notes As Moderator	Average For Other Core Conferences
STUDENT 1	13	4	723	629
STUDENT 2	17	3	946	1246
STUDENT 3	8	1	696	761
STUDENT 4	39	11	687	981
STUDENT 5	21	13	957	768
STUDENT 6	15	3	833	1198
STUDENT 7	8	2	2173	842
STUDENT 8	13	6	1033	786
STUDENT 9	12	3	937	1158
STUDENT 10	7	4	5792	1513
STUDENT 11	14	4	1145	1177
STUDENT 12	2	3	2502	792
STUDENT 13	7	5	1192	1364
STUDENT 14	8	1	927	1247

It can be seen from the data in table 6 that there was no consistent change in the average length of note that students wrote as moderator. Some wrote dramatically longer notes as moderator, while 8 students actually wrote shorter

than average notes as moderator, some significantly shorter. The length of moderator note seems to be largely a function of moderating style or possibly of the way that pairs of students divided the task.

On the other hand, all but one student wrote more notes, some considerably more as moderator than they normally did. As a device for encouraging an active role in the session, the moderating task is quite effective.

No consistent spill over effect could be seen in activity preceeding the moderating task. Three students did have less than average participation in the prior session. But four students had more than average participation in the preceeding conference.

However, nine out of twelve students had less than average participation in the conference immediately following the session where they were moderator! Considering the variability from week to week for most of these students it may be too small a sample to make too much of this, but it is suggestive. Is this a result of mental fatigue after higher than usual participation? Is it perhaps a "well, now I've done my part" kind of mental relaxation?

The moderator task was effective in encouraging greater active participation in the session. There was great individual variability in the effect on length of notes but

almost all students wrote more notes. A possible drawback may be a resultant decrease in the level of participation in the week following the assignment.

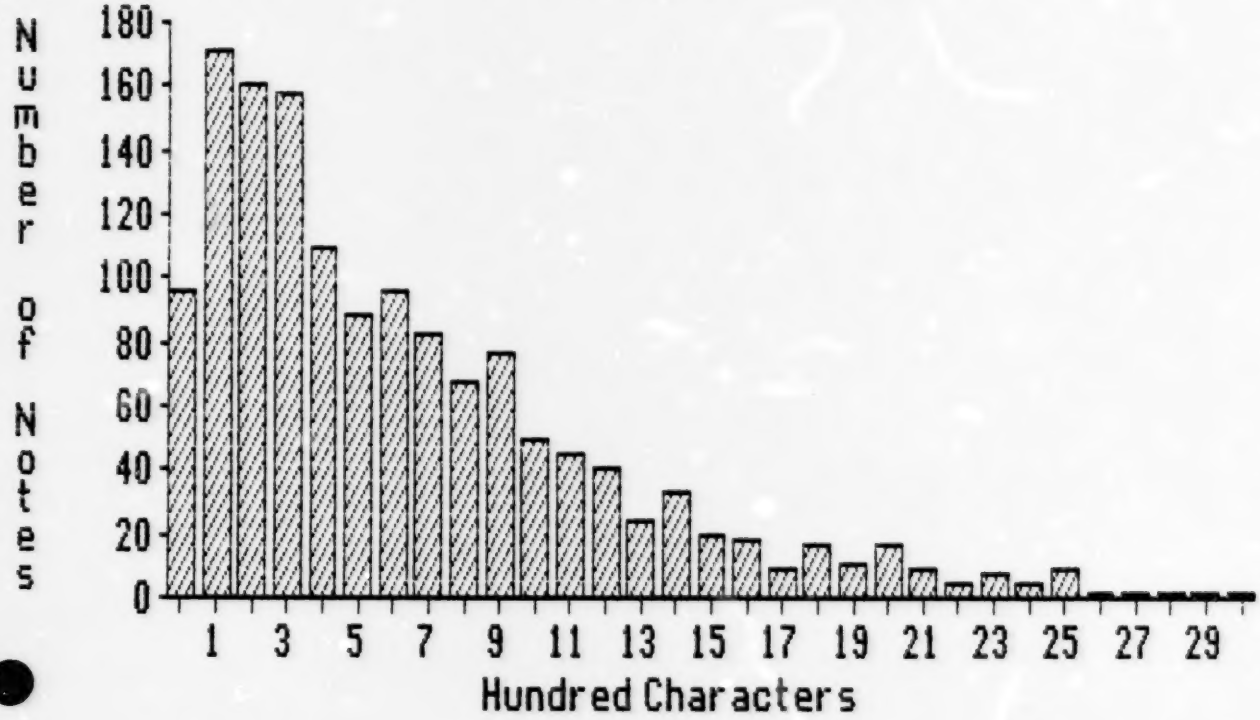
LENGTH OF NOTES

There is no (important) technical limit to the length of notes that could be written. However, in the introductory session students were admonished to keep messages short. One to one and a half screens was to be considered a maximum but not absolute rule. Experience has shown that longer messages are harder to read and digest on the computer screen with its constrained window. Longer notes usually contain more than one topic, making responding and threading more difficult as well.

A message length of slightly less than 1000 characters will generally constitute one screen. As can be seen from figure 23, most messages conformed to this limit. The distribution of message lengths is strongly biased in favor of shorter notes.

As well, there seems to be a differential distribution in the type of note relative to its length. Of the 96 notes that were less than 100 characters, only 30 were in the core conferences. Comparatively, of the 104 notes longer than 2000 characters, 93 were in core conferences. We might

Figure 23 - Distribution of Notes
By Length



postulate that the length of note is loosely related to function. Social and transactional notes might be expected to be shorter than thoughtful, critical, or reflective notes.

Some credence is lent to this by the observation that mean note length for the supplemental conferences was significantly shorter than for the core conferences. And within the supplemental group there were corresponding differences. A help conference (transactional notes) and a chat conference (social notes) had mean lengths of 287 and 347 respectively. While a metalearning conference (reflective notes) had a mean length of 797 much closer to the length of notes in the core conferences. The relationship between length of note and function could be explored further by applying a content analysis for various processes.

Table 7 - Average Length Of Notes

	Core	Suppl	Total
Instructor	961	466	700
Students	1127	525	918
Guests	1738	682	1720
Course Total	1140	516	917

There was considerable variation in the mean length of notes (table 2) written by students. Individual style appears to be a large factor here. As a whole the students wrote slightly longer notes than the instructor and the guests generally wrote much longer notes.

INFORMATION OVERLOAD

Information overload, the phenomenon of having too much information to comfortably manage, is a common complaint in computer conferences. This topic was discussed in several message threads within the course. A search of the notes revealed 42 notes in which this was directly mentioned.

Is the distress of information overload due in fact to the sheer quantity of text that is generated in a highly interactive environment, or is it more nearly a psychological phenomenon engendered by the type of information, the form of its presentation, or perhaps inadequate information management skills? A quantitative analysis of the actual volume of information shared in a conference may shed some light on this.

The number of characters sent seems to be the most reasonable raw measure of the volume of information. But in itself, this information has little meaning to me. It is not a unit I normally measure things in and there is little

basis for comparison. In order to give some meaning to this data I have converted it to number of computer screens of information and number of printed pages.

A computer screen of 80 columns and 24 lines would carry a maximum of 1920 characters. But the usual message contains a a large portion of white space. To allow for white space I reduced the characters/screen by 50% giving 960 characters/screen. Actual examination of 10 screens from one of these conferences revealed this to be a reasonable approximation. A similar transformation for printed pages of transcript yielded a figure of 2200 characters/page and examination of 20 pages of transcript from one of the conferences confirmed this as a reasonable approximation.

Table 8 shows the volume of text generated in this course. Is 614 pages of transcript an unduely large volume of discourse for a graduate seminar? It would be possible to make a comparison by transcribing the talk in a face to face seminar or similar group, but I haven't been able to locate such data.

Table 8 Amount of text generated

	TOTAL	MEAN/WEEK	MEAN/DAY
# characters	1 351 571	122 870	17553
# screens	1 408	128	18
# pages	614	56	8
# notes	1 474	134	19

Another approach would be to measure the time required to read this volume of text. To get an approximation on this I selected 8 pages of printed transcript from one of the conferences, the average daily production. I read these 8 pages for meaning as I would as a participant in the conference including flipping back to previous notes for references as necessary. The total elapsed time for this task was 12.7 minutes. This works out to about 1.5 hours of reading per week. The typical graduate seminar in this institution meets for 3 hours per week.

By this measure the volume of information shared does not seem particularly onerous and the cause of the perception of information overload must be something other than the amount of text.

A quote from Harasim (1987) may shed some light on the phenomenon. "I realize that it's not just the sheer volume of notes that's overwhelming, it's the strain of trying to follow ten or twelve conversations. I have trouble following

a train of thought or the thread of an argument." It is not the volume of text so much as the presentation that leads to the perception of information overload. In a document by a single competent author information is presented in a logical and cohesive order. The order of presentation imposed by the author is a significant aid to assimilation and understanding on the part of the reader.

But in a computer conference the order is more chaotic. Several trains of thought may be interspersed and the burden of bringing order to the chaos rests with the reader. This, more than volume of material is the cause of the information overload crisis. Recognizing that, it is plain that better information management strategies and skills are needed to navigate successfully in this new environment.

CONCLUSION

Usage statistics from an electronic seminar can be analysed to illuminate the effects on participation of various aspects of the course design. Amidst the large individual variablity in participation significant patterns can be identified.

Assigned task, presence of guests, instructor participation, day of week, time of day, and most of all individual

variables of the participants can all be shown to affect participation.

The relative uniformity of participation in the face of large individual fluctuations leads us to wonder if there is a feedback mechanism working to manage the density of messages over time. If this is the case, the evidence of a few people dominating the discussions has negative implications for the level of interaction that might be achieved. This may be true in spite of the evidence that the actual quantity of text was not overwhelming.

Quantitative analysis of usage data does little to evaluate the quality of learning that is achieved in a computer mediated environment. Nonetheless, it may serve as an indicator of both potential problems and successes in certain design features. This descriptive study is based largely on the assumption that active participation is desirable, beneficial, and meaningful.

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APPENDIX A - Weekly Participation Data

Table A1 - Number Of Notes Per Week

	0	1	2	3	4	5	6	7	8	9	10	11	MEAN/WEEK
TOTAL MESSAGES													
STUDENT 1	0	1	11	9	4	4	3	4	5	3	8	11	6
STUDENT 2	0	2	8	5	6	10	11	15	4	3	5	4	7
STUDENT 3	1	4	3	4	7	5	10	8	9	0	0	0	5
STUDENT 4	0	12	27	9	15	0	28	22	12	13	43	36	20
STUDENT 5	0	15	23	7	35	36	27	34	20	22	14	33	24
STUDENT 6	0	2	5	3	5	3	4	11	15	6	4	3	6
STUDENT 7	0	1	4	1	1	2	8	5	7	2	4	3	3
STUDENT 8	1	2	12	10	11	16	12	17	6	10	12	14	11
STUDENT 9	0	2	7	3	3	3	4	6	4	3	16	7	5
STUDENT 10	0	0	10	4	4	10	8	5	1	8	5	6	6
STUDENT 11	1	3	9	6	3	6	0	12	6	7	19	3	7
STUDENT 12	2	3	5	6	5	7	6	10	3	5	2	2	5
[illegible]ENT 13	0	3	13	4	7	0	3	0	4	0	18	23	7
STUDENT 14	0	2	2	1	2	2	2	10	3	0	1	0	2
GUEST 1	0	0	0	0	0	0	0	0	0	5	1	0	1
GUEST 2	0	1	0	0	0	0	0	0	0	0	0	0	0
GUEST 3	0	0	0	0	0	0	0	0	0	0	1	2	0
GUEST 4	0	0	0	0	14	0	0	0	0	0	0	0	1
GUEST 5	0	0	0	0	1	5	0	0	0	0	0	0	1
GUEST 6	0	0	0	0	0	15	0	0	0	0	0	0	1
GUEST 7	0	0	0	0	0	1	1	0	1	0	0	0	0
INSTRUCTOR	6	18	7	12	15	18	25	28	15	13	15	12	17
STUDENT TOTAL	5	52	139	72	108	104	126	159	99	82	151	145	113
GUEST TOTAL	0	1	0	0	15	21	1	0	1	5	2	2	4
TOTAL COUNT	11	71	146	84	138	143	152	187	115	100	168	159	134

Table A2 - Weekly Notes As % Of Weekly Flow

	0	1	2	3	4	5	6	7	8	9	10	11+	COURSE
TOTAL MESSAGES													
STUDENT 1	0%	1%	8%	11%	3%	3%	2%	2%	4%	3%	5%	7%	4%
STUDENT 2	0%	3%	5%	6%	4%	7%	7%	8%	3%	3%	3%	3%	5%
STUDENT 3	9%	6%	2%	5%	5%	3%	7%	4%	8%	0%	0%	0%	3%
STUDENT 4	0%	17%	18%	11%	11%	0%	18%	12%	10%	13%	26%	23%	15%
STUDENT 5	0%	21%	16%	8%	25%	25%	18%	18%	17%	22%	8%	21%	18%
STUDENT 6	0%	3%	3%	4%	4%	2%	3%	6%	13%	6%	2%	2%	4%
STUDENT 7	0%	1%	3%	1%	1%	1%	5%	3%	6%	2%	2%	2%	3%
STUDENT 8	9%	3%	8%	12%	8%	11%	8%	9%	5%	10%	7%	9%	8%
STUDENT 9	0%	3%	5%	4%	2%	2%	3%	3%	3%	3%	10%	4%	4%
STUDENT 10	0%	0%	7%	5%	3%	7%	5%	3%	1%	8%	3%	4%	4%
STUDENT 11	9%	4%	6%	7%	2%	4%	0%	6%	5%	7%	11%	2%	5%
STUDENT 12	18%	4%	3%	7%	4%	5%	4%	5%	3%	5%	1%	1%	4%
STUDENT 13	0%	4%	9%	5%	5%	0%	2%	0%	3%	0%	11%	14%	5%
STUDENT 14	0%	3%	1%	1%	1%	1%	1%	5%	3%	0%	1%	0%	2%
GUEST 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	1%	0%	0%
GUEST 2	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%
GUEST 4	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%	1%
GUEST 5	0%	0%	0%	0%	1%	3%	0%	0%	0%	0%	0%	0%	0%
GUEST 6	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	1%
GUEST 7	0%	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	0%	0%
INSTRUCTOR	55%	25%	5%	14%	11%	13%	16%	15%	13%	13%	9%	8%	12%
STUDENT TOTAL	45%	73%	95%	86%	78%	73%	83%	85%	86%	82%	90%	91%	84%
GUEST TOTAL	0%	1%	0%	0%	11%	15%	1%	0%	1%	5%	1%	1%	3%
TOTAL COUNT	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table A3 - Weekly Length Of Notes

	WEEKLY LENGTH OF NOTES												
	0	1	2	3	4	5	6	7	8	9	10	11	MEAN/WEEK
TOTAL CHARACTER													
STUDENT 1	0	963	4567	9160	2286	1331	956	1943	2094	1893	4564	7557	3392
STUDENT 2	0	1414	7460	10791	3299	10414	7311	12104	3891	4015	4515	3217	6221
STUDENT 3	202	4318	2276	2889	2585	1856	11833	4043	4725	0	0	0	3157
STUDENT 4	0	7720	18935	14091	10858	0	27344	12599	9097	10896	21414	23084	14185
STUDENT 5	0	7468	12903	9440	27107	25599	14526	27446	9722	19117	8178	14748	16023
STUDENT 6	0	1926	2510	1822	8045	2591	3001	9008	12048	6392	3915	1476	4794
STUDENT 7	0	926	3767	88	492	1559	17367	4700	4918	1065	2446	2042	3579
STUDENT 8	202	1180	7970	3485	7080	13404	5491	9788	5382	5509	6030	5653	6470
STUDENT 9	0	2878	4196	1492	3252	3628	3024	6655	4220	2041	16727	5950	4915
STUDENT 10	0	0	8539	1638	15732	19095	22370	8139	8627	10643	5724	7354	9806
STUDENT 11	94	2595	5917	13081	3423	3933	0	10086	2936	8502	14671	298	5958
STUDENT 12	322	1956	1669	2822	9855	2581	3232	6994	833	3165	530	1063	3184
STUDENT 13	0	1610	22559	5691	8345	0	3789	0	3559	0	24251	21318	8284
STUDENT 14	0	2033	1962	251	1884	3400	1482	8547	2283	0	1179	0	2093
GUEST 1	0	0	0	0	0	0	0	0	0	3053	1312	0	397
GUEST 2	0	1863	0	0	0	0	0	0	0	0	0	0	169
GUEST 3	0	0	0	0	0	0	0	0	0	0	106	759	79
GUEST 4	0	0	0	0	22412	0	0	0	0	0	0	0	2037
GUEST 5	0	0	0	0	1021	11319	0	0	0	0	0	0	1122
GUEST 6	0	0	0	0	0	28972	0	0	0	0	0	0	2634
GUEST 7	0	0	0	0	0	3534	2982	0	5246	0	0	0	1069
INSTRUCTOR	2748	5812	8270	7929	9404	13358	11775	28273	13860	12757	9898	4729	11710
STUDENT TOTAL	2267	42799	113500	84670	113647	102749	133501	150325	88195	85995	124042	98489	103653
GUEST TOTAL	0	1863	0	0	23433	43825	2982	0	5246	3053	1418	759	7507
TOTAL CHARACTER	5015	50474	121770	92599	146484	159932	148258	178598	107301	101805	135358	103977	122870

Table A4 - Length Of Note As % Of Weekly Total

	0	1	2	3	4	5	6	7	8	9	10	11	COURSE
TOTAL CHARACTER													
STUDENT 1	0%	2%	4%	10%	2%	1%	1%	1%	2%	2%	3%	7%	3%
STUDENT 2	0%	3%	6%	12%	2%	7%	5%	7%	4%	4%	3%	3%	5%
STUDENT 3	4%	9%	2%	3%	2%	1%	8%	2%	4%	0%	0%	0%	3%
STUDENT 4	0%	15%	16%	15%	7%	0%	18%	7%	8%	11%	16%	22%	12%
STUDENT 5	0%	15%	11%	10%	19%	16%	10%	15%	9%	19%	6%	14%	13%
STUDENT 6	0%	4%	2%	2%	5%	2%	2%	5%	11%	6%	3%	1%	4%
STUDENT 7	0%	2%	3%	0%	0%	1%	12%	3%	5%	1%	2%	2%	3%
STUDENT 8	4%	2%	7%	4%	5%	8%	4%	5%	5%	5%	4%	5%	5%
STUDENT 9	0%	6%	3%	2%	2%	2%	2%	4%	4%	2%	12%	6%	4%
STUDENT 10	0%	0%	7%	2%	11%	12%	15%	5%	8%	10%	4%	7%	8%
STUDENT 11	2%	5%	5%	14%	2%	2%	0%	6%	3%	8%	11%	0%	5%
STUDENT 12	6%	4%	1%	3%	7%	2%	2%	4%	1%	3%	0%	1%	3%
STUDENT 13	0%	3%	19%	6%	6%	0%	3%	0%	3%	0%	18%	21%	7%
STUDENT 14	0%	4%	2%	0%	1%	2%	1%	5%	2%	0%	1%	0%	2%
GUEST 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	1%	0%	0%
GUEST 2	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
GUEST 4	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	0%	2%
GUEST 5	0%	0%	0%	0%	1%	7%	0%	0%	0%	0%	0%	0%	1%
GUEST 6	0%	0%	0%	0%	0%	18%	0%	0%	0%	0%	0%	0%	2%
GUEST 7	0%	0%	0%	0%	0%	2%	2%	0%	5%	0%	0%	0%	1%
INSTRUCTOR	55%	12%	7%	9%	6%	8%	8%	16%	13%	13%	7%	5%	10%
STUDENT TOTAL	45%	85%	93%	91%	78%	64%	90%	84%	82%	84%	92%	95%	84%
GUEST TOTAL	0%	4%	0%	0%	16%	27%	2%	0%	5%	3%	1%	1%	6%
TOTAL CHARACTER	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table A5 - Mean Length Of Note For Weekly Session

	0	1	2	3	4	5	6	7	8	9	10	11	COURSE
MEAN LENGTH													
STUDENT 1	0	963	415	1018	572	333	319	486	419	631	570	687	592
STUDENT 2	0	707	932	2158	550	1041	665	807	973	1338	903	804	937
STUDENT 3	202	1080	759	722	369	371	1183	505	525	0	0	0	681
STUDENT 4	0	643	701	1566	724	0	977	573	758	838	498	641	719
STUDENT 5	0	498	561	1349	774	711	538	807	486	869	584	447	663
STUDENT 6	0	963	502	607	1609	864	750	819	803	1065	979	492	864
STUDENT 7	0	926	942	88	492	780	2171	940	703	532	612	681	1036
STUDENT 8	202	590	664	348	644	838	458	576	897	551	502	404	579
STUDENT 9	0	1439	599	497	1084	1209	756	1109	1055	680	1045	850	932
STUDENT 10	0	0	854	410	3933	1910	2796	1628	8627	1330	1145	1226	1768
STUDENT 11	94	865	657	2180	1141	656	0	840	489	1215	772	99	874
STUDENT 12	161	652	334	470	1971	369	539	699	278	633	265	532	625
STUDENT 13	0	537	1735	1423	1192	0	1263	0	890	0	1347	927	1215
STUDENT 14	0	1016	981	251	942	1700	741	855	761	0	1179	0	921
[illegible]T 1	0	0	0	0	0	0	0	0	0	611	1312	0	728
GUEST 2	0	1863	0	0	0	0	0	0	0	0	0	0	1863
GUEST 3	0	0	0	0	0	0	0	0	0	0	106	380	288
GUEST 4	0	0	0	0	1601	0	0	0	0	0	0	0	1601
GUEST 5	0	0	0	0	1021	2264	0	0	0	0	0	0	2057
GUEST 6	0	0	0	0	0	1931	0	0	0	0	0	0	1931
GUEST 7	0	0	0	0	0	3534	2982	0	5246	0	0	0	3921
INSTRUCTOR	458	323	1181	661	627	742	471	1010	924	981	660	394	700
STUDENT MEAN	453	823	817	1176	1052	988	1060	945	891	1049	821	679	918
GUEST MEAN	0	1863	0	0	1562	2087	2982	0	5246	611	709	380	1720
COURSE MEAN	456	711	834	1102	1061	1118	975	955	933	1018	806	654	917

APPENDIX B - Core Conference Participation Data

Table B1 - Number Of Notes Per Core Session

	MESSAGES IN CORE CONFERENCES																
CONF	IN	OBJ	DEB	RI	RA	MED	DE	SF	DE	CN	HA	VC	NA		TOTAL		MEAN
WEEK	1	1	1	2	3	4	5	6	7	8	9	10	11				
TOTAL MESSAGES																	
STUDENT 1	1	1	4	6	1	4	4	3	4	5	3	5	13		54		5
STUDENT 2	1	1	1	6	1	5	2	17	2	4	3	4	3		50		5
STUDENT 3	1	2	1	0	0	4	0	3	2	8	0	0	0		21		2
STUDENT 4	1	3	9	14	1	13	0	13	18	10	11	14	39		146		13
STUDENT 5	1	2	9	7	1	13	22	9	28	11	21	8	20		152		14
STUDENT 6	0	1	1	1	1	3	2	1	11	15	2	3	3		44		4
STUDENT 7	1	1	1	1	0	1	1	8	6	4	2	4	2		32		3
STUDENT 8	1	1	6	4	0	13	6	5	8	3	6	7	8		68		6
STUDENT 9	1	1	0	5	0	3	3	2	4	2	4	12	6		43		4
STUDENT 10	1	1	4	5	0	4	7	3	4	1	5	2	6		43		4
STUDENT 11	1	1	5	8	1	3	4	1	5	3	6	14	0		52		5
STUDENT 12	1	1	2	6	1	2	4	5	2	0	4	0	2		30		3
STUDENT 13	1	1	5	5	0	7	1	0	0	4	0	17	19		60		5
STUDENT 14	1	1	1	0	0	2	2	2	8	1	0	1	0		19		2
GUEST 1	0	0	0	0	0	0	0	0	0	0	6	0	0		6		1
GUEST 2	0	0	0	0	0	0	0	0	0	0	0	0	0		0		0
GUEST 3	0	0	0	0	0	0	0	0	0	0	0	0	0		0		0
GUEST 4	0	0	0	0	0	14	0	0	0	0	0	0	0		14		1
GUEST 5	0	0	0	0	0	0	6	0	0	0	0	0	0		6		1
GUEST 6	0	0	0	0	0	0	15	0	0	0	0	0	0		15		1
GUEST 7	0	0	0	0	0	0	0	3	0	0	0	0	0		3		0
INSTRUCTOR	0	0	1	3	0	7	7	7	28	7	14	7	6		87		8
STUDENT TOTAL	13	18	49	68	7	77	58	72	102	71	67	91	121		814		74
GUEST TOTAL	0	0	0	0	0	14	21	3	0	0	6	0	0		44		4
TOTAL COUNT	13	18	50	71	7	98	86	82	130	78	87	98	127		945		86

Table B2 - Number Of Notes Per Core Session As % Of Conference Total

CONF	IN	OBJ	DEB	RI	RA	MED	DE	SF	OE	CN	HA	VC	NA	TOTAL
WEEK	1	1	1	2	3	4	5	6	7	8	9	10	11	
TOTAL MESSAGES														
STUDENT 1	8%	6%	8%	8%	14%	4%	5%	4%	3%	6%	3%	5%	10%	6%
STUDENT 2	8%	6%	2%	8%	14%	5%	2%	21%	2%	5%	3%	4%	2%	5%
STUDENT 3	8%	11%	2%	0%	0%	4%	0%	4%	2%	10%	0%	0%	0%	2%
STUDENT 4	8%	17%	18%	20%	14%	13%	0%	16%	14%	13%	13%	14%	31%	15%
STUDENT 5	8%	11%	18%	10%	14%	13%	26%	11%	22%	14%	24%	8%	16%	16%
STUDENT 6	0%	6%	2%	1%	14%	3%	2%	1%	8%	19%	2%	3%	2%	5%
STUDENT 7	8%	6%	2%	1%	0%	1%	1%	10%	5%	5%	2%	4%	2%	3%
STUDENT 8	8%	6%	12%	6%	0%	13%	7%	6%	6%	4%	7%	7%	6%	7%
STUDENT 9	8%	6%	0%	7%	0%	3%	3%	2%	3%	3%	5%	12%	5%	5%
STUDENT 10	8%	6%	8%	7%	0%	4%	8%	4%	3%	1%	6%	2%	5%	5%
STUDENT 11	8%	6%	10%	11%	14%	3%	5%	1%	4%	4%	7%	14%	0%	6%
STUDENT 12	8%	6%	4%	8%	14%	2%	5%	6%	2%	0%	5%	0%	2%	3%
STUDENT 13	8%	6%	10%	7%	0%	7%	1%	0%	0%	5%	0%	17%	15%	6%
STUDENT 14	8%	6%	2%	0%	0%	2%	2%	2%	6%	1%	0%	1%	0%	2%
GUEST 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	1%
GUEST 2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 4	0%	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%	1%
GUEST 5	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	1%
GUEST 6	0%	0%	0%	0%	0%	0%	17%	0%	0%	0%	0%	0%	0%	2%
GUEST 7	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%
INSTRUCTOR	0%	0%	2%	4%	0%	7%	8%	9%	22%	9%	16%	7%	5%	9%
STUDENT TOTAL	100%	100%	98%	96%	100%	79%	67%	88%	78%	91%	77%	93%	95%	86%
GUEST TOTAL	0%	0%	0%	0%	0%	14%	24%	4%	0%	0%	7%	0%	0%	5%
TOTAL COUNT	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table B3 - Length Of Notes Per Core Session

CONF	IN	OBJ	DEB	RI	RA	MED	DE	SF	OE	CN	HA	VC	NA	TOTAL	MEAN
WEEK	1	1	1	2	3	4	5	6	7	8	9	10	11		
TOTAL CHARACTERS															
STUDENT 1	863	870	2185	1453	7271	2286	1331	956	1943	2094	1893	2624	9396	35165	3197
STUDENT 2	1303	1599	1024	4837	7675	2658	2176	16086	4721	3891	4015	4188	3043	57216	5201
STUDENT 3	1853	1876	1561	0	0	2057	0	2086	458	5569	0	0	0	15460	1405
STUDENT 4	1202	3726	7038	11743	7700	9887	0	22606	11753	8489	9992	10783	26784	131703	11973
STUDENT 5	970	1305	5720	4742	4959	10258	18299	5563	28609	5409	20092	4126	10589	120641	10967
STUDENT 6	0	822	1104	1356	6203	2623	2087	1938	10050	12495	3488	3584	1476	47226	4293
STUDENT 7	926	846	492	2051	0	492	1321	17383	4912	3851	1065	2446	1797	37582	3417
STUDENT 8	962	1008	3513	3888	0	13424	4358	3657	9001	2962	4799	4737	4326	56635	5149
STUDENT 9	1268	1610	0	4212	0	3252	3198	1905	6101	2037	6630	11243	5698	47154	4287
STUDENT 10	1498	602	1760	5069	0	2413	40546	4684	8146	8627	9752	4550	7354	95001	8636
STUDENT 11	989	1073	2763	7134	9223	3423	3486	1345	6536	2411	6334	16026	0	60743	5522
STUDENT 12	487	657	1189	2704	8316	657	1368	2842	5004	0	2880	0	1063	27167	2470
STUDENT 13	1271	1337	6073	14678	0	8345	1706	0	0	3559	0	23124	20545	80638	7331
STUDENT 14	910	1188	774	0	0	1884	3400	2999	7416	1388	0	1179	0	21138	1922
GUEST 1	0	0	0	0	0	0	0	0	0	0	4365	0	0	4365	397
GUEST 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 4	0	0	0	0	0	19052	0	0	0	0	0	0	0	19052	1732
GUEST 5	0	0	0	0	0	0	12340	0	0	0	0	0	0	12340	1122
GUEST 6	0	0	0	0	0	0	28972	0	0	0	0	0	0	28972	2634
GUEST 7	0	0	0	0	0	0	0	11762	0	0	0	0	0	11762	1069
INSTRUCTOR	0	0	502	1411	0	5968	8502	4613	32732	5977	14932	5619	3344	83600	7600
STUDENT TOTAL	14502	18519	35698	65278	51347	69627	91778	88663137382		68759	85872	94229	95415	917069	83370
GUEST TOTAL	0	0	0	0	0	19052	41312	11762	0	0	4365	0	0	76491	6954
TOTAL CHARACTERS	14502	18519	36200	66689	51347	94647141592105038170114				74736105169		99848	98759	1077160	97924

Table B4 - Length Of Note In Core Conference As % Of Conference Total

CONF	IN	OBJ	DEB	RI	RA	MED	DE	SF	OE	CN	HA	VC	NA	TOTAL
WEEK	1	1	1	2	3	4	5	6	7	8	9	10	11	
TOTAL CHARACTERS														
STUDENT 1	6%	5%	6%	2%	14%	2%	1%	1%	1%	3%	2%	3%	10%	3%
STUDENT 2	9%	9%	3%	7%	15%	3%	2%	15%	3%	5%	4%	4%	3%	5%
STUDENT 3	13%	10%	4%	0%	0%	2%	0%	2%	0%	7%	0%	0%	0%	1%
STUDENT 4	8%	20%	19%	18%	15%	10%	0%	22%	7%	11%	10%	11%	27%	12%
STUDENT 5	7%	7%	16%	7%	10%	11%	13%	5%	17%	7%	19%	4%	11%	11%
STUDENT 6	0%	4%	3%	2%	12%	3%	1%	2%	6%	17%	3%	4%	1%	4%
STUDENT 7	6%	5%	1%	3%	0%	1%	1%	17%	3%	5%	1%	2%	2%	3%
STUDENT 8	7%	5%	10%	6%	0%	14%	3%	3%	5%	4%	5%	5%	4%	5%
STUDENT 9	9%	9%	0%	6%	0%	3%	2%	2%	4%	3%	6%	11%	6%	4%
STUDENT 10	10%	3%	5%	8%	0%	3%	29%	4%	5%	12%	9%	5%	7%	9%
STUDENT 11	7%	6%	8%	11%	18%	4%	2%	1%	4%	3%	6%	16%	0%	6%
STUDENT 12	3%	4%	3%	4%	16%	1%	1%	3%	3%	0%	3%	0%	1%	3%
STUDENT 13	9%	7%	17%	22%	0%	9%	1%	0%	0%	5%	0%	23%	21%	7%
STUDENT 14	6%	6%	2%	0%	0%	2%	2%	3%	4%	2%	0%	1%	0%	2%
GUEST 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%
GUEST 2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 4	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	2%
GUEST 5	0%	0%	0%	0%	0%	0%	9%	0%	0%	0%	0%	0%	0%	1%
GUEST 6	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	3%
GUEST 7	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	0%	0%	0%	1%
INSTRUCTOR	0%	0%	1%	2%	0%	6%	6%	4%	19%	8%	14%	6%	3%	8%
STUDENT TOTAL	100%	100%	99%	98%	100%	74%	65%	84%	81%	92%	82%	94%	97%	85%
GUEST TOTAL	0%	0%	0%	0%	0%	20%	29%	11%	0%	0%	4%	0%	0%	7%
TOTAL CHARACTERS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table B5 - Mean Length Of Notes Per Core Session

CONF	IN	OBJ	DEB	RI	RA	MED	DE	SF	OE	CN	HA	VC	NA	TOTAL
WEEK	1	1	1	2	3	4	5	6	7	8	9	10	11	
MEAN LENGTH														
STUDENT 1	863	870	546	242	7271	572	333	319	486	419	631	525	723	651
STUDENT 2	1303	1599	1024	806	7675	532	1088	946	2360	973	1338	1047	1014	1144
STUDENT 3	1853	938	1561	0	0	514	0	695	229	696	0	0	0	736
STUDENT 4	1202	1242	782	839	7700	761	0	1739	653	849	908	770	687	902
STUDENT 5	970	652	636	677	4959	789	832	618	1022	492	957	516	529	794
STUDENT 6	0	822	1104	1356	6203	874	1044	1938	914	833	1744	1195	492	1073
STUDENT 7	926	846	492	2051	0	492	1321	2173	819	963	532	612	898	1174
STUDENT 8	962	1008	586	972	0	1033	726	731	1125	987	800	677	541	833
STUDENT 9	1268	1610	0	842	0	1084	1066	952	1525	1018	1658	937	950	1097
STUDENT 10	1498	602	440	1014	0	603	5792	1561	2036	8627	1950	2275	1226	2209
STUDENT 11	989	1073	553	892	9223	1141	872	1345	1307	804	1056	1145	0	1168
STUDENT 12	487	657	594	451	8316	328	342	568	2502	0	720	0	532	906
STUDENT 13	1271	1337	1215	2936	0	1192	1706	0	0	890	0	1360	1081	1344
STUDENT 14	910	1188	774	0	0	942	1700	1500	927	1388	0	1179	0	1113
GUEST 1	0	0	0	0	0	0	0	0	0	0	728	0	0	728
GUEST 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 4	0	0	0	0	0	1361	0	0	0	0	0	0	0	1361
GUEST 5	0	0	0	0	0	0	2057	0	0	0	0	0	0	2057
GUEST 6	0	0	0	0	0	0	1931	0	0	0	0	0	0	1931
GUEST 7	0	0	0	0	0	0	0	3921	0	0	0	0	0	3921
INSTRUCTOR	0	0	502	470	0	853	1215	659	1169	854	1067	803	557	961
STUDENT MEAN	1116	1029	729	960	7335	904	1582	1231	1347	968	1282	1035	789	1127
GUEST MEAN	0	0	0	0	0	1361	1967	3921	0	0	728	0	0	1738
COURSE MEAN	1116	1029	724	939	7335	966	1646	1281	1309	958	1209	1019	778	1140

APPENDIX C - Participation Data For Supplementary Conferences

Table C1 - Number Of Notes Per Supplementary Conference

CONF	AS	CH	LL	ST	AN	FE	BT	LIB	PM	TH	TS	CF	3551	TOTAL
TOTAL MESSAGES														
STUDENT 1	3	2	3	0	0	0	0	0	0	0	1	0	0	9
STUDENT 2	0	12	9	0	0	0	0	0	1	0	0	0	1	23
STUDENT 3	0	11	11	0	0	0	0	1	2	2	0	0	3	30
STUDENT 4	11	21	9	0	3	1	0	1	0	0	11	0	9	66
STUDENT 5	15	42	31	3	5	3	4	1	4	5	1	0	0	114
STUDENT 6	3	4	5	0	0	0	0	5	0	0	0	0	0	17
STUDENT 7	1	1	3	0	0	0	0	0	1	0	0	0	0	6
STUDENT 8	10	21	8	0	0	0	1	0	5	3	0	0	7	55
STUDENT 9	2	8	3	0	0	0	0	0	0	0	0	0	2	15
STUDENT 10	0	4	9	0	0	0	0	1	1	0	0	0	3	18
STUDENT 11	2	16	4	0	0	0	0	0	0	0	0	0	1	23
STUDENT 12	0	15	5	0	0	0	1	0	0	0	0	0	5	26
[illegible]ENT 13	3	5	2	0	0	0	0	0	0	0	1	0	4	15
STUDENT 14	0	0	1	0	0	0	0	4	0	0	0	0	1	6
GUEST 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 2	0	0	0	0	0	0	0	1	0	0	0	0	0	1
GUEST 3	0	0	0	0	0	0	0	0	0	0	0	0	3	3
GUEST 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INSTRUCTOR	3	16	18	0	2	0	3	1	3	2	0	1	48	97
STUDENT TOTAL	50	162	103	3	8	4	6	13	14	10	14	0	36	423
GUEST TOTAL	0	0	0	0	0	0	0	1	0	0	0	0	3	4
TOTAL COUNT	53	178	121	3	10	4	9	15	17	12	14	1	87	524

Table C2 - Number Of Notes In Supplementary Conference As % Of Conference Total

CONF	AS	CH	LL	ST	AN	FE	BT	LIB	PM	TH	TS	CF	3551	TOTAL
TOTAL MESSAGES														
STUDENT 1	6%	1%	2%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	2%
STUDENT 2	0%	7%	7%	0%	0%	0%	0%	0%	6%	0%	0%	0%	1%	4%
STUDENT 3	0%	6%	9%	0%	0%	0%	0%	7%	12%	17%	0%	0%	3%	6%
STUDENT 4	21%	12%	7%	0%	30%	25%	0%	7%	0%	0%	79%	0%	10%	13%
STUDENT 5	28%	24%	26%	100%	50%	75%	44%	7%	24%	42%	7%	0%	0%	22%
STUDENT 6	6%	2%	4%	0%	0%	0%	0%	33%	0%	0%	0%	0%	0%	3%
STUDENT 7	2%	1%	2%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	1%
STUDENT 8	19%	12%	7%	0%	0%	0%	11%	0%	29%	25%	0%	0%	8%	10%
STUDENT 9	4%	4%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	3%
STUDENT 10	0%	2%	7%	0%	0%	0%	0%	7%	6%	0%	0%	0%	3%	3%
STUDENT 11	4%	9%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	4%
STUDENT 12	0%	8%	4%	0%	0%	0%	11%	0%	0%	0%	0%	0%	6%	5%
STUDENT 13	6%	3%	2%	0%	0%	0%	0%	0%	0%	0%	7%	0%	5%	3%
STUDENT 14	0%	0%	1%	0%	0%	0%	0%	27%	0%	0%	0%	0%	1%	1%
GUEST 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 2	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%
GUEST 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	1%
GUEST 4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
INSTRUCTOR	6%	9%	15%	0%	20%	0%	33%	7%	18%	17%	0%	100%	55%	19%
STUDENT TOTAL	94%	91%	85%	100%	80%	100%	67%	87%	82%	83%	100%	0%	41%	81%
GUEST TOTAL	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	3%	1%
TOTAL COUNT	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table c3 - Length Of Note In Supplementary Conferences

CONF	AS	CH	LL	ST	AN	FE	BT	LIB	PM	TH	TS	CF	3551	TOTAL
TOTAL CHARACTERS														
STUDENT 1	891	526	531	0	0	0	0	0	0	0	101	0	0	2049
STUDENT 2	0	3564	6414	0	0	0	0	0	1126	0	0	0	111	11215
STUDENT 3	0	3652	12538	0	0	0	0	73	1328	1103	0	0	573	19267
STUDENT 4	3455	4861	7819	0	768	166	0	646	0	0	3340	0	2508	23563
STUDENT 5	4250	9963	20759	805	7851	1275	4285	491	2276	2139	519	0	0	54613
STUDENT 6	951	1602	1910	0	0	0	0	1045	0	0	0	0	0	5508
STUDENT 7	245	121	704	0	0	0	0	0	718	0	0	0	0	1788
STUDENT 8	1816	4713	2594	0	0	0	127	0	2777	1010	0	0	1184	14221
STUDENT 9	576	4158	1841	0	0	0	0	0	0	0	0	0	334	6909
STUDENT 10	0	991	9869	0	0	0	0	289	725	0	0	0	1004	12878
STUDENT 11	263	2869	1567	0	0	0	0	0	0	0	0	0	94	4793
STUDENT 12	0	4961	1993	0	0	0	315	0	0	0	0	0	586	7855
STUDENT 13	986	4855	3093	0	0	0	0	0	0	0	52	0	1498	10484
STUDENT 14	0	0	102	0	0	0	0	1678	0	0	0	0	103	1883
GUEST 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 2	0	0	0	0	0	0	0	1863	0	0	0	0	0	1863
GUEST 3	0	0	0	0	0	0	0	0	0	0	0	0	865	865
GUEST 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INSTRUCTOR	897	7476	12327	0	423	0	1301	603	1305	744	0	354	19783	45213
STUDENT TOTAL	14330	54312	84061	805	9042	1441	6028	4825	10255	4996	4012	354	27778	222239
GUEST TOTAL	0	0	0	0	0	0	0	1863	0	0	0	0	865	2728
TOTAL CHARACTERS	15227	61788	96388	805	9465	1441	7329	7291	11560	5740	4012	708	48426	270180

Table C4 - Length Of Note In Supplementary Conference As % Of Conference Total

CONF	AS	CH	LL	ST	AN	FE	BT	LIB	PM	TH	TS	CF	3551	TOTAL
TOTAL CHARACTERS														
STUDENT 1	6%	1%	1%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%
STUDENT 2	0%	6%	7%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	4%
STUDENT 3	0%	6%	13%	0%	0%	0%	0%	1%	11%	19%	0%	0%	1%	7%
STUDENT 4	23%	8%	8%	0%	8%	12%	0%	9%	0%	0%	83%	0%	5%	9%
STUDENT 5	28%	16%	22%	100%	83%	88%	58%	7%	20%	37%	13%	0%	0%	20%
STUDENT 6	6%	3%	2%	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	2%
STUDENT 7	2%	0%	1%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	1%
STUDENT 8	12%	8%	3%	0%	0%	0%	2%	0%	24%	18%	0%	0%	2%	5%
STUDENT 9	4%	7%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%
STUDENT 10	0%	2%	10%	0%	0%	0%	0%	4%	6%	0%	0%	0%	2%	5%
STUDENT 11	2%	5%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
STUDENT 12	0%	8%	2%	0%	0%	0%	4%	0%	0%	0%	0%	0%	1%	3%
[illegible]ENT 13	6%	8%	3%	0%	0%	0%	0%	0%	0%	0%	1%	0%	3%	4%
STUDENT 14	0%	0%	0%	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	1%
GUEST 1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 2	0%	0%	0%	0%	0%	0%	0%	26%	0%	0%	0%	0%	0%	1%
GUEST 3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%
GUEST 4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 6	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
GUEST 7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
INSTRUCTOR	6%	12%	13%	0%	4%	0%	18%	8%	11%	13%	0%	50%	41%	17%
STUDENT TOTAL	94%	88%	87%	100%	96%	100%	82%	66%	89%	87%	100%	50%	57%	82%
GUEST TOTAL	0%	0%	0%	0%	0%	0%	0%	26%	0%	0%	0%	0%	2%	1%
TOTAL CHARACTERS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table C5 - Mean Length Of Notes Per Supplementary Conference

	AS	CH	LL	ST	AN	FE	BT	LIB	PM	TH	TS	CF	3551	TOTAL
MEAN LENGTH														
STUDENT 1	297	263	177	0	0	0	0	0	0	0	101	0	0	228
STUDENT 2	0	297	713	0	0	0	0	0	1126	0	0	0	111	488
STUDENT 3	0	332	1140	0	0	0	0	73	664	552	0	0	191	642
STUDENT 4	314	231	869	0	256	166	0	646	0	0	304	0	279	357
STUDENT 5	283	237	670	268	1570	425	1071	491	569	428	519	0	0	479
STUDENT 6	317	400	382	0	0	0	0	209	0	0	0	0	0	324
STUDENT 7	245	121	235	0	0	0	0	0	718	0	0	0	0	298
STUDENT 8	182	224	324	0	0	0	127	0	555	337	0	0	169	259
STUDENT 9	288	520	614	0	0	0	0	0	0	0	0	0	167	461
STUDENT 10	0	248	1097	0	0	0	0	289	725	0	0	0	335	715
STUDENT 11	132	179	392	0	0	0	0	0	0	0	0	0	94	208
STUDENT 12	0	331	399	0	0	0	315	0	0	0	0	0	117	302
STUDENT 13	329	971	1546	0	0	0	0	0	0	0	52	0	374	699
STUDENT 14	0	0	102	0	0	0	0	420	0	0	0	0	103	314
GUEST 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 2	0	0	0	0	0	0	0	1863	0	0	0	0	0	1863
GUEST 3	0	0	0	0	0	0	0	0	0	0	0	0	288	288
GUEST 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUEST 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INSTRUCTOR	299	467	685	0	212	0	434	603	435	372	0	354	412	466
STUDENT MEAN	287	335	816	268	1130	360	1005	371	732	500	287	0	772	525
GUEST MEAN	0	0	0	0	0	0	0	1863	0	0	0	0	288	682
COURSE MEAN	287	347	797	268	946	360	814	486	680	478	287	708	557	516